

LIBRARY CHECK OUT/CHECK IN SYSTEM

BACKGROUND OF THE INVENTION

This invention relates principally to a self operated check-in check-out terminal for books or other articles to be removed from or returned to a library or other facility. Such a terminal may be the principal component of a computerized library circulation system, performing operations that are conventionally performed by a librarian. The system speeds the performance of check in/check out operations and relieves the librarian to perform other tasks.

A conventional library check-out procedure is as follows. The patron supplies his library card to the librarian. The card usually has a bar code, either printed or recorded on magnetic tape to identify the patron to the librarian. The librarian scans the card in a reader. The reader sends the patron's coded identity to a computer data base maintained by the library to determine the status of the patron's account. After it is determined that the account is in proper order by a signal to the librarian, the librarian scans a bar code printed on a surface of the article with a reader, which then compares the bar code with a data base to determine the circulation status of the article. Where the data base indicates that the article may be checked out, the system operates to modify the circulation status to indicate that the book is being checked out. Many libraries are also equipped with security surveillance devices responsive to the magnetic state of material applied to the article. Once the librarian has determined that the patron status and article circulation status are acceptable, the article may be handed to the patron on the far side of a surveillance gate, or passed over a magnetic desensitizer which permits the patron to pass the article through the security gate without triggering an alarm condition.

Some libraries have patron self check-in check-out systems that are generally operated as follows. To check out a book the patron places his library card in a reader that scans his identification code. As described previously, a computer data base is activated and provides a display screen the status of the patron's account. If the patron's account is in order, the patron proceeds to pass the coded label on the book by a scanner in the terminal. If the circulation status of the book allows it to be checked out/checked in, the system then records the transaction then enables the adjacent security surveillance device to sensitize/desensitize the magnetic material, thereby allowing the patron to carry the book through the security gate.

Such a computerized library circulation control system are described in the prior art. For example, U.S. Pat. No. 3,665,449 (Elder et al.), describes the use of magnetic materials on the article to be sensed later at a security gate for electronic article surveillance. The Elder patent further discloses the integration of a security magnetic security system with a book circulation control system. The magnetic security system operates to change the state of the magnetic security marker upon verification of the book circulation status and the patron account status. U.S. Pat. No. 4,141,078 (Bridges, Jr. et al.) provides more detail of a system integrating the book circulation control system and a security system. The Bridges patent is more particularly directed to the construction of such a system including a particular means for deterring patron abuse through efforts demagnetize additional books that have not cleared the

circulation control system. Specifically, the Bridges patent proposes the construction of a chute having an inclined surface surrounded by optical sensors, wherein only a single book is disposed within the view of the scanner and additional books are urged downwardly away from the scanner. Consequently, the demagnetizer disposed adjacent the scanner will only demagnetize a single book. Efforts to hold two books in the region of the scanner will trigger the optical sensors, precluding any demagnetization.

Though systems such as that disclosed in the Bridges patent are useful to permit a patron to check in and check out books, they suffer from significant practical shortcomings related to the efficiency and reliability of the system.

The present invention significantly improves upon contemporary systems in that it avoids the need for chutes or other types of inclined surfaces that hinder practical efficiency, particularly where the system throughput is high. The present invention further avoids the need for a ring of optical scanners that may inadvertently triggered in the course of checking in or checking out a large number of books. Additionally, the present invention provides significant additional security as a consequence of the use of dual scanners, rather than a single scanner. Accordingly, as described below, the present invention allows for significant improvements in the practical implementation of library circulation control systems suitable for independent patron usage.

SUMMARY OF THE INVENTION

A self check out/check in terminal is disclosed for facilitating independent withdrawal or return of articles having article identifying indicia on opposing surfaces thereof, and alterable security indicia for indicating the circulation status of the article. The terminal comprises first and second readers disposed at space opposed locations and operative to read the plurality of article identifying indicia and generate first and second article identifying signals in response thereto. Processing circuitry is provided in electrical communication with the readers and includes comparator circuitry for receiving the first and second article identifying signals and for generating a third signal when said first and second article identifying signals are substantially identical. Security indicia control circuitry is provided for altering the security indicia upon the article in response to the generation of the third signal.

The system may further incorporate user identification circuitry for receiving a user identification card having user identifying indicia disposed thereon, and for generating a user identification signal in response thereto. A user identification circuitry may incorporate a third reader, or, alternatively, may utilize the first or second reader, on a time shared basis.

User status information and article circulation status information may be maintained in a memory circuit disposed within the terminal, or may be accessed from a separate location. Memory or memories incorporating such information may be updated on a periodic basis from an external location.

The security indicia control circuitry may further be gated by information respecting the patron status, e.g. the status of the patron's account. Additionally, the operation of the security control circuitry may be gated by a sensor disposed adjacent the readers to insure that the single article remains in place during the entire